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Patent # ________________

TITLE **Particle Accelerator Space Engine**

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1 claim

Cross Reference to Related Applications - This invention pertains to a propulsion device employing particle accelerator / storage ring / braking device technology to provide novel method and mechanism for vertical propulsion, referred to as "Gyroscopic Lift".

Federal Status of Funding -The invention described herein is not a Federal funded research and development project.

Background of Invention - The invention utilizes a principle found by experimentation by Hideo Hayasaka of Tohoku University, Japan as published in 1989. In this experiment, high speed gyroscopes were dropped inside a vacuum tube for the purpose of measuring the changes to the rate of fall. The conclusion to was that the high speed gyroscopes fell at a lesser rate of acceleration than gravity. That experiment proved controversial, with problems arising due to small values of acceleration change, which required extremely high rotational velocities. A solid gyroscope shatters under conditions that would provide better testing values. Theoretically, when particle velocity for an atom located within the mass of the gyroscopic rim becomes circular orbit velocity, the rim becomes weightless, and should hover in a vacuum indefinitely. Spinning a gyroscope or creating such a circular flow of particles at velocities above circular orbit velocity causes upward thrust. This invention utilizes particle stream technology rather

than a solid gyroscope, so as to develop higher velocities in comparison to those required for particles to orbit the planet or provide maximum effect in relation to interaction with gravitational forces . The invention utilizes principle operations of three types of particle stream technology in a new and novel application. Those technologies are particle accelerators, storage rings, and braking devices. In addition, a new mathematical model in physics is portrayed for a helical orbital pattern

Brief Summary of the Invention- This invention utilizes particle accelerator/ storage ring/ braking device technology in new and novel applications concerning methods of propulsion. The Particle Accelerator Space Engine is mobile, allowing particle motion to cause reactive motions to the engine, and vice versa. A mathematical trajectory for an upward helical path is presented. The particle accelerators are positioned one atop another having counter-rotational particle flow. A common axis of rotation for both doughnuts travels through the center-point of the accelerators and is aligned with a gravitational chord to the center of the earth. Electricity is converted into kinetic energy as individual particles gain velocity. Each particle has its own orbital trajectory as well as a relation with the particle accelerator. An initial launching thrust is initiated to the engine, that also initiates the upward helical trajectory of particles in the particle stream. Once launched a sidestepping action of particles that have a portion of velocity traveling perpendicular to gravity at velocities greater than circular orbit velocity causes upward acceleration as the particles seek the path of an upward helical trajectory. A transfer of energy occurs as the particles in stream attempt to slow in their circulatory path, losing kinetic energy, while the engine is accelerated upward, gaining potential energy. The engine itself is given

upward thrust when the upward force generated by the particle stream exceeds the dead weight of the vessel and any non moving mechanical parts.

Brief description of drawings - Figures 1 through 9 are designed to show the methodology and mathematics for vertical propulsion, referred to as "Gyroscopic Lift". Figure 1 represents a typical placement for two counter-circulatory particle accelerator doughnuts. Each doughnut provides upward thrust as demonstrated in the successive drawings. Figure 2 represents a circulatory path for a stream of particles found in one of the doughnuts. Unlike a solid gyroscope, the effect of gravity on the particle stream is calculated as a summation of forces on each particle, rather than on the center of gravity to a solid gyroscopic ring. An atom, particle, or any body of mass located as traveling around such ring can be attributed kinetic energy along a straight line that is perpendicular to a gravitational chord from particle to the planet center. An individual particle's vertical thrust calculates; thrust = $m_{(particle)} (v^2/r + a_{gravity})$. Symmetry may be used to reapportion the mass of the particle stream as equivalent to that of 4 theoretic point particles located at the intersection of the axis, each equivalent to ¼ particle stream mass. Figure 3 represents a directional analysis of radial acceleration relative to the earth for a typical point particle at an instantaneous time. Figure 4 represents the particle trajectory for an individual particle as the particle moves through time and space. Figure 5 represents a directional analysis of radial acceleration as a cumulative effect for the sum of all particles in the circulatory path. Figure 6 is a pair of two dimensional graphs depicting all accelerative influences exerted upon point particles. Figure 7 is a mathematical derivation for determining acceleration, and thrust related to vertical propulsion. Figure 8 is an example of the formula for thrust derived in figure 7. Figure 9 is a mathematic theoretic example for determining a ships vertical acceleration rate.

Detailed description - Referring now to the drawings; The Particle Accelerator Space Engine is composed of two circular particle accelerator/ storage ring/ braking devices , mounted one above the other, with particle.streams traveling in counter-rotational directions, as depicted in figure 1. The purpose of counter-rotation is to prevent unwanted rotation of the spacecraft, and to provide equal but opposite relation of forces in the conversion of electrical energy into kinetic energy. Counter-rotation allows particles generate their own kinetic energy rather than push away from the earth to gain that energy. The timing of acceleration of kickers is such that acceleration of particles clockwise in one doughnut are balanced with acceleration of particles counterclockwise in the second doughnut. The ability to kick particles to higher, stable, or lower velocity is regulated by timing and intensity of particle accelerator station kicks, and magnetic forces located about the circumference of the doughnuts. Figure 2 is a representation of one of the circular particle accelerators with particles traveling counterclockwise. Particles are circulated in the device at velocities above circular orbit velocity for relative altitude of the planet. For mathematical purposes, symmetry can be used to treat the mass of the particle stream as if it were equally distributed to points that intersect the xz and yz planes, at an instantaneous time. These theoretic point particles are labeled H, I, J and K. Figure 2 also depicts the directional component of velocity for each point particle perpendicular to gravity. Figure 3 is a typical representation depicting how the instantaneous component of velocity for each point particle interacts with the earth's gravity to provide radial acceleration relative to the planet. Mathematically, radial acceleration is computed as v^2/r, with r representing the radius to the planet center. In all scientific examples, notably those in celestial mechanics, objects that travel perpendicular to gravity above circular orbit velocity continue on, to gain altitude as time progresses. In such state, the particle may be regarded as sidestepping gravity, at a faster rate

than falling. Most of celestial mechanics involves two dimensional curved trajectories. Typically, an object that has velocity perpendicular to gravity between circular orbit velocity and escape velocity enters the ascending side of an elliptic orbit..; At escape velocity, an object enters the ascending side of a parabolic obit, and above escape velocity an object enters the ascending side of a hyperbolic orbit. Unless other perturbing forces are present, to throw the object off track, it always gains altitude. In the Particle Accelerator Space Engine, the magnitude of velocity for the particle stream is much greater than escape velocity. The effect of an ascending hyperbolic orbit with a centripetal perturbation towards the center axis of rotation in the Particle Accelerator Space Engine creates an ascending helical trajectory. Figure 4 depicts an ascending helical trajectory for an individual particle as it moves through 3 dimensional space. The upward spiral of the point particle is contained to an imaginary cylinder surface by electromagnetic forces within the Particle Accelerator Space Engine. Kinetic energy from particles in the stream form a sidestepping relation to gravity creating lift for the craft. As particles sidestep to higher elevations they lose kinetic energy and gain potential energy. Figure 5 is a 3 dimensional depiction for all theoretic point particles, and the instantaneous acceleration vectors of gravity, centripetal acceleration relative to the center of the accelerator, and radial acceleration relative to the planet. Figure 6 is a pair of two dimensional graphs representing the xz , and yz planes. The acceleration vectors in figure 5 are transcribed to figure 6, such that component values can be easily seen. The trigonomic triangles enable the vectors to be broken down to component vectors for their respective axis. Point particle H is traveling perpendicular to the page outward. Point particle J is traveling perpendicular to the page inward. Point particle K is traveling perpendicular to the page outward. Point particle I is traveling perpendicular to the page inward. Sample initialing:

107 $a_{(rxH)}$ = radial acceleration component, to earth center relative to x axis for particle H.

108 $a_{(rzH)}$ = radial acceleration component, to earth center relative to z axis for particle H.

109 $a_{(cxH)}$ = centripetal acceleration component, to ring center relative to x axis for particle H.

110 $a_{(czH)}$ = centripetal acceleration component, to ring center relative to z axis for particle H

111 $a_{(gxH)}$ = gravity acceleration component, to earth center relative to x axis for particle H.

112 $a_{(gzH)}$ = gravity acceleration component, to earth center relative to z axis for particle H.

113 $a_{(rxJ)}$ = radial acceleration component, to earth center relative to x axis for particle J.

114 $a_{(rzJ)}$ = radial acceleration component, to earth center relative to z axis for particle J.

115 $a_{(cxJ)}$ = centripetal acceleration component, to ring center relative to x axis for particle J.

116 $a_{(czJ)}$ = centripetal acceleration component, to ring center relative to z axis for particle J

117 $a_{(gxJ)}$ = gravity acceleration component, to earth center relative to x axis for particle J.

118 $a_{(gzJ)}$ = gravity acceleration component, to earth center relative to z axis for particle J.

119 $a_{(ryK)}$ = radial acceleration component, to earth center relative to y axis for particle K.

120 $a_{(rzK)}$ = radial acceleration component, to earth center relative to z axis for particle K.

121 $a_{(cyK)}$ = centripetal acceleration component, to ring center relative to y axis for particle K.

122 $a_{(czK)}$ = centripetal acceleration component, to ring center relative to z axis for particle K

123 $a_{(gyK)}$ = gravity acceleration component, to earth center relative to y axis for particle K.

124 $a_{(gzK)}$ = gravity acceleration component, to earth center relative to z axis for particle K.

125 $a_{(ryI)}$ = radial acceleration component, to earth center relative to y axis for particle I.

126 $a_{(rzI)}$ = radial acceleration component, to earth center relative to z axis for particle I.

127 $a_{(cyI)}$ = centripetal acceleration component, to ring center relative to y axis for particle I.

128 $a_{(czI)}$ = centripetal acceleration component, to ring center relative to z axis for particle I

129 $a_{(gyI)}$ = gravity acceleration component, to earth center relative to y axis for particle I.

$a_{(gzI)}$ = gravity acceleration component, to earth center relative to z axis for particle I.

Figure 7 is a mathematical formula for determining gyroscopic lift. It sums the component vectors of acceleration in a manner that reveals an equation for instantaneous thrust, and instantaneous acceleration in the z direction. To describe the mathematical process: An initial equation is generated for Force exerted by each of the 4 theoretic point particles. Each particle is assigned ¼ of the mass of the particle stream which is multiplied by the cumulative accelerations exerted on or by the particle. The four point particle equations are written one above another so as to form columns for summation. Although the hypotenuse' for the 4 theoretic point particles may differ in direction, their magnitudes are equal, and their component vectors either compliment one another or oppose one another. When all of the acceleration vectors are broken down into vector components then summed, the result causes many vector components to cancel each other out, leaving only acceleration in the z direction, referred to as $a_{(z)}$. The mathematical formula for vertical acceleration is : $\mathbf{a_{(z)} \approx v^2/r + a_g}$. The mathematical formula for vertical thrust is : $\mathbf{m_{particle\ stream} a_{(z)} = thrust}$.

Figure 8 is a mathematical model presented for the purpose of demonstrating use of the equations for vertical thrust. In the upper equation an amount of thrust is calculated for 50 milligrams of ionized particles traveling at 60% velocity of light in one of the particle accelerator rings. The particle stream may be brought to a constant velocity, similar to a storage ring, but with the intent of harnessing upward thrust. For an individual ring, this example produces 2.54×10^5 Newtons of thrust. Although specific values are used for mass, velocity, and thrust, the equations are not limited to these values, nor is it required that the velocity of the particle stream be constant, in order that upward thrust be developed. Many combinations of particle stream velocity, and mass are possible, such that varying these configurations while in

flight allows the craft to navigate altitude. Figure 9 is a mathematical model for the purpose of demonstrating use of equations derived in figure 8. If the vehicle is fitted with two particle accelerators, with particle flow in counter-rotational directions, it would double the upward thrust. The equation adds upward force generated through gyroscopic lift of the particles, with downward force of gravity as applied to the deadweight of the ship, to determine the overall force with which the craft should move. With particle velocity of .6c, a vehicle , such as a commercial passenger vehicle, fitted with a circular Particle Accelerator Space Engine around the perimeter, and deadweight of approximately 40 metric tons would be capable of vertical acceleration at about .3 g's. In the vacuum of outer space it has the potential to develop a very high top velocity. Once a desired altitude is found, it may be stabilized by adjusting the particle stream velocity such that upward thrust that is generated matches the force of gravity. Any velocity of circulatory matter exceeding circular orbit velocity may be utilized to harness upward acceleration and/ or thrust. Thus many combinations of matter quantity, and velocity may be combined to create and /or navigate using such a propulsion engine.

What is Claimed

Independant Claim 1.) The invention creates a new method and mechanism of vertical propulsion. It circulates matter, within the confine of a machine, at velocities above that required for circular orbit of the planet, for the purpose of utilizing whatever portion of particle radial acceleration, relative to the planet center, that can be harnessed toward creating vertical propulsion for the entire machine.

Abstract of Disclosure -The invention provides a method for vertical propulsion in aerospace flight. The invention circulates matter, within the confine of a machine, such that a portion of particle speed, which is perpendicular to gravity, is greater than the magnitude of

velocity required for circular orbit of the planet. Thus developing a sidestepping relation with gravity, so as to develop radial acceleration relative to the planet center, creating a vertical force, associated with the mass of the particle stream times the radial acceleration, thereby generating vertical thrust. This methodology shall be referred to as "Gyroscopic Lift". Although the particular embodiment shown utilizes particles traveling perpendicular to gravity, it should not be concluded that this is the only arrangement possible. Whenever a particle has a component of velocity perpendicular to gravity in excess of circular orbit velocity, it is suitable to provide some measure of vertical thrust. Thus many particle accelerator designs utilizing this feature are feasible for the present invention. Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced other than as specifically described.